AR-CAS-0101
77 GHz Radar Sensor
(Preliminary Data)

Summary:
3-beam 77 GHz pulse-doppler radar sensor. 100 meter range, 3-degree pencil beams.

Applications:
Collision-Avoidance Radar
Industrial Process Control
Height/Range Sensing
Obstacle Detection
Security

Radar Specifications:
RF Frequency: 76.0 – 77.0 GHz
IF Frequency: 180 MHz (Typ.)
Radar Operation: Pulse-Doppler
Pulse Width: Programmable (20 ns – 1000 ns)
PRF: Programmable (1 kHz – 100 kHz)
Beamwidth: 3 degrees (pencil beam)
Range: 100 meters (typical)
Number Beams: 3

Power Supply:
DC Supply: +18 VDC (500 mA)

Control Inputs:
Radar controllable via either on-board DIP switches or external TTL signal via a 10-pin header. Inputs include:
  Beam selection (1 – 3)
  Pulse width (20ns – 1000 ns)
  PRF (1kHz – 100 KHz)

Outputs:
IF Output (SMA)
Digital Timing Signal (SMA)

Mechanical Dimensions:
Size: 6.0” x 5.5” x 2.5”
Weight: Approx. 2 Lbs.
Figure 1: Typical Radiation Patterns, Beams 1 – 3

![Curves showing radiation patterns with labels for Azimuth, (Deg), Beam Peak Deg, Beam Width (Deg), and Side Lobes (Rel. DB).]

Overlays
98273_00.DAT-ant_under_test
98273_01.DAT-ant_under_test
98273_02.DAT-ant_under_test

Figure 2: Sensor Block Diagram

+18 VDC, GND

TTL Inputs

IF Output

Timing Output

Control Electronics

mmW module

VCO
77 GHz

LO Switch

MIXER

T/R Switch

Beam Select

IF Output

Antenna
Figure 3: Driver/Control Electronics

- Pulse Control Connector + DIP Switches
- 77 GHz Gunn Oscillator
- IF Output SMA Conn.
- +18 VDC Input
- Digital Timing Output (SMA)
Figure 4: IF Output Signal: (a) 100 ns pulse, 200 mV/div; (b) 20 ns pulse mode, 50 mV/div. Scope time scale is 50 ns/div.